

HIGH-DENSITY FINFET INTEGRATION SCHEME

Abstract

The invention provides a method of manufacturing a fin-type field effect transistor (FinFET) that begins by patterning a rectangular loop of semiconductor material having two longer fins and two shorter sections. The process continues by patterning a rectangular gate conductor over central sections of the two longer fins, wherein the gate conductor intersects the two longer fins. Next, the invention dopes portions of the semiconductor material not covered by the gate conductor to form source and drain regions in portions of the fins that extend beyond the gate. Following this, the invention forms insulating sidewalls along the gate conductor. Then, the invention covers the gate conductor and the semiconductor material with a conductive contact material and forms a contact mask over a portion of the conductive contact material that is above source and drain regions of a first fin of the two longer fins. The invention follows this by selectively etching regions of the conductive contact material and the semiconductor material not protected by the contact mask. This leaves the conductive contact material on source and drain regions of the first fin and removes source and drain regions of a second fin of the two longer fins. This process forms a unique FinFET that has a first fin with a central

channel region and source and drain regions adjacent the channel region, a gate intersecting the first fin and covering the channel region, and a second fin having only a channel region. The second fin is parallel to the first fin and covered by the gate.